### **ANALYTICAL SUMMARY REPORT**

September 25, 2018

Helena City of Water Division 1115 Rimini Rd Helena, MT 59601-9624

Work Order: H18090230

Project Name: DIP

Energy Laboratories Inc Helena MT received the following 1 sample for Helena City of Water Division on 9/12/2018 for analysis.

Lab ID	Client Sample ID	Collect Date Receiv	e Date Matrix	Test
H18090230-001	#1-4	09/12/18 10:00 09/1:	2/18 Aqueous	Metals by ICP/ICPMS, Total Cyanide, Total Manual Distillation Chromium, Hexavalent Chromium, Trivalent Mercury, Total pH Metals Digestion by E200.2 Mercury Digestion by E245.1

The analyses presented in this report were performed by Energy Laboratories, Inc., 3161 E. Lyndale Ave., Helena, MT 59604, unless otherwise noted. Any exceptions or problems with the analyses are noted in the Laboratory Analytical Report, the QA/QC Summary Report, or the Case Narrative.

The results as reported relate only to the item(s) submitted for testing.

If you have any questions regarding these test results, please call.

Report Approved By:

Billings, MT **800.735.4489** • Casper, WY **888.235.0515** Gillette, WY **866.686.7175** • Helena, MT **877.472.0711** 

**CLIENT:** Helena City of Water Division

Project: DIP Report Date: 09/25/18

Work Order: H18090230 CASE NARRATIVE

Tests associated with analyst identified as ELI-B were subcontracted to Energy Laboratories, 1120 S. 27th St., Billings, MT, EPA Number MT00005.



### LABORATORY ANALYTICAL REPORT

Prepared by Helena, MT Branch

Client: Helena City of Water Division

Project: DIP

Lab ID: H18090230-001

Client Sample ID: #1-4

**Report Date:** 09/25/18 Collection Date: 09/12/18 10:00 DateReceived: 09/12/18

Matrix: Aqueous

					MCL/		
Analyses	Result	Units	Qualifiers	RL	QCL	Method	Analysis Date / By
PHYSICAL PROPERTIES							
рН	8.0	s.u.	Н	0.1		A4500-H B	09/13/18 09:17 / SRW
pH Measurement Temp	11.7	°C				A4500-H B	09/13/18 09:17 / SRW
INORGANICS							
Cyanide, Total	0.012	mg/L		0.005		Kelada-01	09/14/18 15:12 / eli-b
METALS, DISSOLVED							
Chromium, Hexavalent	ND	mg/L		0.01		A3500-Cr B	09/12/18 13:24 / cmm
Chromium, Trivalent	0.05	mg/L		0.01		Calculation	09/25/18 07:45 / abc
METALS, TOTAL							
Arsenic	0.004	mg/L		0.001		E200.8	09/17/18 14:25 / sld
Cadmium	0.00067	mg/L		0.00003		E200.8	09/17/18 14:25 / sld
Chromium	0.046	mg/L		0.005		E200.8	09/17/18 14:25 / sld
Copper	0.431	mg/L		0.002		E200.8	09/17/18 14:25 / sld
Lead	0.149	mg/L		0.0003		E200.8	09/17/18 14:25 / sld
Mercury	ND	mg/L		5E-06		E245.1	09/14/18 12:23 / dck
Molybdenum	0.001	mg/L		0.001		E200.8	09/17/18 14:25 / sld
Nickel	0.183	mg/L		0.002		E200.8	09/17/18 14:25 / sld
Selenium	ND	mg/L		0.001		E200.8	09/17/18 14:25 / sld
Silver	ND	mg/L		0.0002		E200.8	09/17/18 14:25 / sld
Zinc	0.075	mg/L		0.008		E200.8	09/17/18 14:25 / sld

Report RL - Analyte reporting limit. **Definitions:** 

QCL - Quality control limit.

H - Analysis performed past recommended holding time.

MCL - Maximum contaminant level. ND - Not detected at the reporting limit.

Page 3 of 14

Prepared by Helena, MT Branch

Client:Helena City of Water DivisionReport Date:09/25/18Project:DIPWork Order:H18090230

Analyte		Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method:	A3500-Cr B							Analytica	Run: G	ENESYS 20_	180912A
Lab ID:	ICV	Initial	Calibratio	n Verification Sta	ndard					09/12/	18 13:24
Chromium,	Hexavalent		0.0954	mg/L	0.010	95	90	110			
Lab ID:	CCV	Conti	nuing Cali	bration Verificatio	n Standa	rd				09/12/	18 13:24
Chromium,	Hexavalent		0.0999	mg/L	0.010	100	90	110			
Method:	A3500-Cr B									Batch:	R138118
Lab ID:	MBLK	Metho	od Blank				Run: GENE	SYS 20_180912	2A	09/12/	18 13:24
Chromium,	Hexavalent		ND	mg/L	0.01						
Lab ID:	H18090230-001BMS	Samp	ole Matrix	Spike			Run: GENE	SYS 20_180912	2A	09/12/	18 13:24
Chromium,	Hexavalent		0.0917	mg/L	0.010	92	80	120			
Lab ID:	H18090230-001BMS	<b>D</b> Samp	ole Matrix	Spike Duplicate			Run: GENE	SYS 20_180912	2A	09/12/	18 13:24
Chromium,	Hexavalent		0.0960	mg/L	0.010	96	80	120	4.6	30	
Lab ID:	H18090230-001BDU	P Samp	ole Duplica	nte			Run: GENE	SYS 20_180912	2A	09/12/	18 13:24
Chromium,	Hexavalent		ND	mg/L	0.010						
Lab ID:	H18090230-001BDU	P- Samp	ole Duplica	ite			Run: GENE	SYS 20_180912	2A	09/12/	18 13:24
Chromium,	Hexavalent		ND	mg/L	0.010						

### Qualifiers:

RL - Analyte reporting limit.



Prepared by Helena, MT Branch

Client:Helena City of Water DivisionReport Date: 09/25/18Project:DIPWork Order: H18090230

,											
Analyte		Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method:	A4500-H B							Analytica	al Run: P	HSC_101-H	_180913A
Lab ID:	pH 7	2 Init	ial Calibration	on Verification	Standard					09/13	/18 08:44
рН			7.0	s.u.	0.1	99	98	102			
pH Measu	rement Temp		21.3	°C			0	0			
Method:	A4500-H B									Batch:	: R138137
Lab ID:	H18090238-001ADUF	2 Sai	mple Duplic	ate			Run: PHSC	_101-H_18091	3A	09/13	/18 09:22
рН			8.2	s.u.	0.1				0.0	3	
pH Measu	rement Temp		12.1	°C							

Prepared by Helena, MT Branch

Client:Helena City of Water DivisionReport Date:09/25/18Project:DIPWork Order:H18090230

Analyte		Count Resi	ult Units	RL	%REC	Low Limit	High Limit	RPD RPDLimit	Qual
Method:	E200.8						Analytic	al Run: ICPMS205-H	_180917A
Lab ID:	ICV	10 Initial Calil	oration Verific	ation Standard				09/17/	/18 11:06
Arsenic		0.06	10 mg/L	0.0050	102	90	110		
Cadmium		0.03	14 mg/L	0.0010	105	90	110		
Chromium		0.06	15 mg/L	0.010	102	90	110		
Copper		0.06	21 mg/L	0.010	104	90	110		
Lead		0.06	22 mg/L	0.010	104	90	110		
Molybdenu	ım	0.06	18 mg/L	0.0050	103	90	110		
Nickel		0.06	22 mg/L	0.010	104	90	110		
Selenium		0.06	13 mg/L	0.0050	102	90	110		
Silver		0.03	13 mg/L	0.0050	104	90	110		
Zinc		0.06	28 mg/L	0.010	105	90	110		
Lab ID:	ICSA	10 Interference	ce Check Sam	nple A				09/17/	/18 11:08
Arsenic		6.82E-	05 mg/L	0.0050					
Cadmium		0.0002	47 mg/L	0.0010					
Chromium		0.001	22 mg/L	0.010					
Copper		0.0001	21 mg/L	0.010					
Lead		0.0007	63 mg/L	0.010					
Molybdenu	ım	0.8	64 mg/L	0.0050	108	70	130		
Nickel		8.25E-	05 mg/L	0.010					
Selenium		0.0001	26 mg/L	0.0050					
Silver		7.23E-	05 mg/L	0.0050					
Zinc		0.0003	31 mg/L	0.010					
Lab ID:	ICSAB	10 Interference	ce Check Sam	nple AB				09/17/	/18 11:10
Arsenic		0.009	97 mg/L	0.0050	100	70	130		
Cadmium		0.01	00 mg/L	0.0010	100	70	130		
Chromium		0.02	04 mg/L	0.010	102	70	130		
Copper		0.01	90 mg/L	0.010	95	70	130		
Lead		0.0004	54 mg/L	0.010		0	0		
Molybdenu	ım	0.8	49 mg/L	0.0050	106	70	130		
Nickel		0.01	92 mg/L	0.010	96	70	130		
Selenium		0.009	59 mg/L	0.0050	96	70	130		
Silver		0.01	97 mg/L	0.0050	98	70	130		
Zinc		0.009	69 mg/L	0.010	97	70	130		
Lab ID:	ICV	10 Initial Calil	oration Verific	ation Standard				09/17/	/18 17:40
Arsenic		0.05	93 mg/L	0.0050	99	90	110		
Cadmium		0.02	96 mg/L	0.0010	99	90	110		
Chromium		0.05	98 mg/L	0.010	100	90	110		
Copper		0.06		0.010	100	90	110		
Lead		0.05		0.010	95	90	110		
Molybdenu	ım	0.05		0.0050	98	90	110		
Nickel		0.06		0.010	100	90	110		
Selenium		0.06		0.0050	103	90	110		
Silver		0.02		0.0050	98	90	110		

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

Prepared by Helena, MT Branch

Client:Helena City of Water DivisionReport Date:09/25/18Project:DIPWork Order:H18090230

Analyte		Count Res	ult Units	RL	%REC	Low Limit	High Limit	RPD RPDLimit	Qual
Method:	E200.8						Analytic	al Run: ICPMS205-F	I_180917/
Lab ID:	ICV	10 Initial Cal	ibration Verificati	on Standard				09/17	7/18 17:40
Zinc		0.00	610 mg/L	0.010	102	90	110		
Lab ID:	ICSA	10 Interferer	ce Check Sampl	le A				09/17	7/18 17:42
Arsenic		8.39E	-05 mg/L	0.0050					
Cadmium		0.0002	231 mg/L	0.0010					
Chromium	ı	0.00	115 mg/L	0.010					
Copper		0.000	141 mg/L	0.010					
Lead		6.19E	-05 mg/L	0.010					
Molybdenu	um	0.8	306 mg/L	0.0050	101	70	130		
Nickel		9.17E	-05 mg/L	0.010					
Selenium		0.000	195 mg/L	0.0050					
Silver		6.04E	-05 mg/L	0.0050					
Zinc		0.0003		0.010					
Lab ID:	ICSAB	10 Interferer	ce Check Sampl	le AB				09/17	7/18 17:44
Arsenic		0.009	982 mg/L	0.0050	98	70	130		
Cadmium		0.009	935 mg/L	0.0010	93	70	130		
Chromium	1	0.0	202 mg/L	0.010	101	70	130		
Copper		0.0	189 mg/L	0.010	94	70	130		
Lead		4.81E	_	0.010		0	0		
Molybdenu	um		785 mg/L	0.0050	98	70	130		
Nickel		0.0	_	0.010	94	70	130		
Selenium		0.009	_	0.0050	98	70	130		
Silver		0.0	_	0.0050	90	70	130		
Zinc		0.009	-	0.010	94	70	130		
Method:	E200.8							Ва	tch: 43072
Lab ID:	MB-43072	10 Method B	lank			Run: ICPM	S205-H_180917	7A 09/17	7/18 14:19
Arsenic		0.0	001 mg/L	4E-05					
Cadmium			ND mg/L	3E-05					
Chromium	1		ND mg/L	0.0001					
Copper			ND mg/L	0.0002					
Lead			ND mg/L	4E-05					
Molybdenu	um		ND mg/L	2E-05					
Nickel			ND mg/L	0.0001					
Selenium		0.0		5E-05					
Silver			-05 mg/L	9E-06					
Zinc		0.0	002 mg/L	0.001					
Lab ID:	LCS-43072	10 Laborato	y Control Sample	e		Run: ICPM	S205-H_180917	7A 09/17	7/18 14:33
			510 mg/L	0.0010	102	85	115		
Arsenic		0 '	263 mg/L	0.0010	105	85	115		
		0.4							
Arsenic	ı			0.0050	107	85	115		
Arsenic Cadmium	ı	0.8		0.0050 0.0050	107 106	85 85	115 115		

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

Prepared by Helena, MT Branch

Client:Helena City of Water DivisionReport Date:09/25/18Project:DIPWork Order:H18090230

Analyte		Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method:	E200.8									Bat	ch: 43072
Lab ID:	LCS-43072	10 Lal	ooratory Co	ntrol Sample			Run: ICPM	S205-H_180917 <i>A</i>	4	09/17/	18 14:33
Molybdenu	ım		0.539	mg/L	0.0010	108	85	115			
Nickel			0.511	mg/L	0.0050	102	85	115			
Selenium			0.500	mg/L	0.0010	100	85	115			
Silver			0.0527	mg/L	0.0010	105	85	115			
Zinc			0.510	mg/L	0.010	102	85	115			
Lab ID:	H18090238-004CMS3	3 10 Sa	mple Matrix	Spike			Run: ICPM	S205-H_180917 <i>A</i>	4	09/17/	18 14:54
Arsenic			0.514	mg/L	0.0010	101	70	130			
Cadmium			0.257	mg/L	0.0010	103	70	130			
Chromium			0.526	mg/L	0.0050	105	70	130			
Copper			0.513	mg/L	0.0050	102	70	130			
Lead			0.548	mg/L	0.0010	109	70	130			
Molybdenu	ım		0.536	mg/L	0.0010	107	70	130			
Nickel			0.496	mg/L	0.0050	99	70	130			
Selenium			0.499	mg/L	0.0010	100	70	130			
Silver			0.0514	mg/L	0.0010	103	70	130			
Zinc			0.504	mg/L	0.010	100	70	130			
Lab ID:	H18090238-004CMSI	<b>)</b> 10 Sa	mple Matrix	Spike Duplicate			Run: ICPM	S205-H_180917 <i>A</i>	4	09/17/	18 14:56
Arsenic			0.505	mg/L	0.0010	99	70	130	1.8	20	
Cadmium			0.247	mg/L	0.0010	99	70	130	4.1	20	
Chromium			0.518	mg/L	0.0050	103	70	130	1.6	20	
Copper			0.498	mg/L	0.0050	99	70	130	2.8	20	
Lead			0.526	mg/L	0.0010	105	70	130	4.1	20	
Molybdenu	ım		0.510	mg/L	0.0010	102	70	130	4.8	20	
Nickel			0.485	mg/L	0.0050	97	70	130	2.3	20	
Selenium			0.503	mg/L	0.0010	101	70	130	0.9	20	
Silver			0.0495	mg/L	0.0010	99	70	130	3.7	20	
Zinc			0.493	mg/L	0.010	97	70	130	2.3	20	

### Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

Prepared by Helena, MT Branch

Client:Helena City of Water DivisionReport Date:09/25/18Project:DIPWork Order:H18090230

Analyte		Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method:	E245.1							Analytica	al Run: I	HGCV202-H_	_180914A
Lab ID:	ICV	Init	ial Calibratio	on Verificati	on Standard					09/14/	18 12:04
Mercury			0.000103	mg/L	0.00010	103	90	110			
Lab ID:	CCV1	Co	ntinuing Cal	ibration Ve	rification Standar	·d				09/14/	18 12:07
Mercury			0.000100	mg/L	0.00010	100	95	105			
Method:	E245.1									Bate	ch: 43081
Lab ID:	MB-43081	Me	thod Blank				Run: HGCV	′202-H_180914A	١	09/14/	18 12:17
Mercury			ND	mg/L	1E-06						
Lab ID:	LCS-43081	Lat	ooratory Cor	ntrol Sample	е		Run: HGCV	′202-H_180914A	١	09/14/	18 12:20
Mercury			7.51E-05	mg/L	0.00010	100	90	110			
Lab ID:	H18090230-001CMS	Sa	mple Matrix	Spike			Run: HGCV	′202-H_180914A	١	09/14/	18 12:27
Mercury			7.44E-05	mg/L	5.0E-06	97	70	130			
Lab ID:	H18090230-001CMS	<b>D</b> Sa	mple Matrix	Spike Dupl	icate		Run: HGCV	′202-H_180914A	١	09/14/	18 12:30
Mercury			7.85E-05	mg/L	5.0E-06	102	70	130	5.4	20	

Prepared by Helena, MT Branch

Client:Helena City of Water DivisionReport Date:09/25/18Project:DIPWork Order:H18090230

Analyte	Count Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: Kelada-01							Analytic	al Run: SUB	-B307393
Lab ID: ICV	Initial Calibration	on Verification St	andard					09/14/	/18 13:42
Cyanide, Total	0.0974	mg/L	0.0050	97	90	110			
Method: Kelada-01								Batch: B_	_R307393
Lab ID: ICB	Method Blank				Run: SUB-I	3307393		09/14/	/18 13:45
Cyanide, Total	ND	mg/L	0.005						
Lab ID: LFB	Laboratory For	tified Blank			Run: SUB-l	3307393		09/14/	/18 13:47
Cyanide, Total	0.102	mg/L	0.0050	102	90	110			
Lab ID: LCS1-K4Fe(CN)6	Laboratory Co	ntrol Sample			Run: SUB-I	3307393		09/14/	/18 13:50
Cyanide, Total	0.194	mg/L	0.0050	97	90	110			
Lab ID: LCS2-KSCN	Laboratory Co	ntrol Sample			Run: SUB-I	B307393		09/14/	/18 13:53
Cyanide, Total	0.138	mg/L	0.0050	1	0	1			
Lab ID: H18090230-001D	Sample Matrix	Spike			Run: SUB-I	307393		09/14/	/18 15:15
Cyanide, Total	0.103	mg/L	0.0050	91	90	110			
Lab ID: H18090230-001D	Sample Matrix	Spike Duplicate			Run: SUB-I	3307393		09/14/	/18 15:17
Cyanide, Total	0.114	mg/L	0.0050	102	90	110	10	10	

### Qualifiers:

## **Work Order Receipt Checklist**

### Helena City of Water Division

### H18090230

Login completed by:	Jessica C. Smith		Date F	Received: 9/12/2018
Reviewed by:	BL2000\rtooke		Red	ceived by: RAT
Reviewed Date:	9/13/2018		Carr	ier name: Hand Del
Shipping container/cooler in	good condition?	Yes	No 🗌	Not Present ✓
Custody seals intact on all sh	nipping container(s)/cooler(s)?	Yes	No 🗌	Not Present ✓
Custody seals intact on all sa	ample bottles?	Yes	No 🗌	Not Present ✓
Chain of custody present?		Yes ✓	No 🗌	
Chain of custody signed whe	en relinquished and received?	Yes ✓	No 🗌	
Chain of custody agrees with	sample labels?	Yes	No 🔽	
Samples in proper container	/bottle?	Yes √	No 🗌	
Sample containers intact?		Yes √	No 🗌	
Sufficient sample volume for	indicated test?	Yes ✓	No 🗌	
All samples received within h (Exclude analyses that are countries as pH, DO, Res Cl, Su	onsidered field parameters	Yes √	No 🗌	
Temp Blank received in all sl	nipping container(s)/cooler(s)?	Yes	No 🗹	Not Applicable
Container/Temp Blank tempe	erature:	19.1°C No Ice - Fro	om Field	
Water - VOA vials have zero	headspace?	Yes	No 🗌	No VOA vials submitted
Water - pH acceptable upon	receipt?	Yes √	No 🗌	Not Applicable

### **Standard Reporting Procedures:**

Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH, Dissolved Oxygen and Residual Chlorine, are qualified as being analyzed outside of recommended holding time.

Solid/soil samples are reported on a wet weight basis (as received) unless specifically indicated. If moisture corrected, data units are typically noted as –dry. For agricultural and mining soil parameters/characteristics, all samples are dried and ground prior to sample analysis.

### **Contact and Corrective Action Comments:**

None



Contact

Email

# Chain of Custody & Analytical Request Record

Mailing Address Company/Name Purchase Order Receive Invoice MHard Copy □Email City, State, Zip Phone 406-45 Account Information (Billing information) aclar of holes at 100 Trust our People, Trust our Data 10000 Quote Helera Int 3 アマハ 2960 Receive Report イグ **Bottle Order** Emph ear hy 友Hard Copy □Email Phone Company/Name Report Information (if different than Account Information) ☐ LEVEL IV ☐ NELAC ☐ EDD/EDT (contact laboratory) ☐ Other Email City, State, Zip Mailing Address Contact Special Report/Formats: www.energylab.com □Email Comments 으

In certain circumstances, samples submitted to Energy Laboratories, Inc. may be subcontracted to other certified laboratories in order to complete the analysis requested.

This serves as notice of this possibility. All subcontracted data will be clearly notated on your analytical report.

# **BOTTLE ORDER 25217**



Page 13 of 14

SHIPPED TO: Helena City of Water Division

**Bob Cline** 

1115 Rimini Rd

Helena MT 59601

Phone: Project:

DIP Metals

Bottle Size/Type

Method

Tests

Critical Hold Time

Preservative

Bottles Per Samp

Order Created by: Wanda Johnson

Shipped From: Helena, MT Ship Date: 10/3/2017

VIA: Hand Del

Notes Num of Samp

<b>DIP Complete Set</b>	:					
250 mL Plastic	1 А4500-Н В рН	PH	0.25 hrs			
250 mL Plastic	1 A3500-Cr B	A3500-Cr Chromium, Hexavalent	24.00 hrs		Need to analyze within 24 Hrs.	
250 mL Plastic	1 E200.7_8	Metals by ICP/ICPMS, Total		EONH		_
	Calculation	Calculation Chromium, Trivalent				-
	E245.1	Mercury, Total				
500 mL Amber Plastic	1 Kelada-01	Kelada-01 Cyanide, Total Manual Distillation		NaOH		_

HNO3 - Nitric Acid

ZnAc - Zinc Acetate

H2SO4 - Sulfuric Acid

NaOH - Sodium Hydroxide

H3PO4 - Phosphoric Acid

shipped the same day as they are collected. We strongly suggest that the samples are

Material Safety Data Sheets(MSDS) Available @ EnergyLab.com ->Services -> MSDS Sheets

Corrosive Chemicals: Nitric, Sulfuric, Phosphoric, Hydrochloric Acids and Sodium Hydroxide. Zinc Acetate is a skin irritant.

Subcontracting of sample analyses to an outside laboratory may be required. If so, Energy Laboratories will utilize its branch laboratories or qualified contract laboratories for this service. Any such laboratories will be indicated within the Laboratory Analytical Report.